Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Additional Spectrum for Unlicensed Devices	)	ET Docket No. 02-380
Below 900 MHz and in the 3 GHz band	)	

COMMENTS
OF
THE LAND MOBILE COMMUNICATIONS COUNCIL

The Land Mobile Communications Council ("LMCC"), pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. § 1.415, hereby respectfully submits its Comments in the above-captioned proceeding.[1]

I. INTRODUCTION

LMCC is a non-profit association of organizations representing virtually all users of land mobile radio systems, providers of land mobile services, and manufacturers of land mobile radio equipment. LMCC acts with the consensus, and on behalf, of the vast majority of public safety, business, industrial, private, commercial and land transportation radio users, as well as a diversity of land mobile service providers and equipment manufacturers. Membership includes the following organizations:

- Aeronautical Radio, Inc. (ARINC)
- American Association of State Highway and Transportation Officials (AASHTO)
- American Automobile Association (AAA)
- American Mobile Telecommunications Association, Inc. (AMTA)
- American Petroleum Institute (API)
- Association of American Railroads (AAR)

[1] *Notice of Inquiry*, ET Docket No. 02-380, FCC 02-328 (rel. Dec. 20, 2002) ("NOI" or "Notice").

- Association of Public Safety Communications Officials-International, Inc. (APCO)
- Central Station Alarm Association (CSAA)
- Forest Industries Telecommunications (FIT)
- Forestry-Conservation Communications Association (FCCA)
- Industrial Telecommunications Association, Inc. (ITA)
- Intelligent Transportation Society of America, Inc. (ITSA)
- International Association of Fire Chiefs (IAFC)
- International Association of Fish and Wildlife Agencies (IAFWA)
- International Municipal Signal Association (IMSA)
- Manufacturers Radio Frequency Advisory Committee (MRFAC)
- National Association of State Foresters (NASF)
- PCIA – The Wireless Infrastructure Association (PCIA)
- Telecommunications Industry Association (TIA)
- United Telecom Council (UTC)

LMCC members are keenly interested in Commission activities relating to the agency's spectrum management responsibilities. Recently, LMCC and a number of individual members submitted comments on the findings of the FCC's Spectrum Policy Task Force ("SPTF").[2] LMCC commended the Commission for undertaking a *de novo* investigation of its spectrum management policies and encouraged the FCC to explore approaches that would enhance the productive use of limited spectrum resources.

One of the areas raised in the SPTF reports was the possibility of expanded use of unlicensed devices. The instant Notice presumably is an outgrowth of that effort. It requests comments on the feasibility of allowing such devices to operate in television broadcast spectrum and in the 3650-3700 ("3650") MHz band as long as they do not cause interference to other users in those bands. The NOI suggests that allowing such operations would be expected to promote the development of new, innovative unlicensed devices, thereby benefiting the economy, businesses and consumers.[3]

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[2] Spectrum Policy Task Force Seeks Public Comment on Issues Related to Commission's Spectrum Policies, *Public Notice*, ET Docket No. 02-135 (rel. June 6, 2002).
[3] NOI at ¶ 1.

In its Reply Comments in the SPTF proceeding, LMCC supported the FCC's further investigation of this subject. It agreed that technology might permit opportunistic, unlicensed devices to share bands with licensed incumbents at some future date, and encouraged the Commission's exploration of those possibilities. However, as described more fully below, LMCC also urged the FCC to consider the comments submitted by entities with substantial technical expertise such as TIA, the major trade association for telecommunications equipment manufacturers and suppliers, and Motorola, Inc., a leading provider of land mobile and other wireless communications equipment and devices.[4] Both organizations expressed concern about the unproven concepts on which the FCC appeared to be relying. Therefore, LMCC encouraged the Commission to proceed carefully since it likely will be difficult, even impossible, to recall or possibly even regulate such devices once they are released into the marketplace.

The concerns raised in the Reply Comments are heightened in light of the instant Notice. Most LMCC members represent entities that operate facilities in the television spectrum shared by land mobile services in eleven of the largest markets in the nation and/or are planning to operate facilities in the new 700 MHz public safety and guard bands currently encumbered by TV broadcasters in the main metropolitan areas of the country. For the reasons described herein, LMCC urges the FCC to prohibit or restrict the operation of unlicensed devices in TV spectrum as necessary to ensure the continued, interference-free operation of land mobile facilities in those bands.

II DISCUSSION

It is clear the FCC considers the widespread deployment of unlicensed devices one of its recent success stories. The NOI identifies items as mundane as electronic toys and as advanced

[4] LMCC Reply Comments at pp. 4-7.

as computer local area networks as examples of unlicensed products that have benefited the consumer public and, therefore, the nation's economy. The Notice specifically identifies the FCC's largely "hands off" regulatory approach as deserving substantial credit for this success and the corollary development of industry standards such as Wi-fi and Bluetooth.

LMCC agrees that our world has been enhanced by the availability of a wide range of unlicensed devices. Cordless phones, garage door openers, baby monitors and similar products are so deeply embedded in our day-to-day environment that life without them is all but unimaginable. The issue is not whether the Commission should continue to promote the development and deployment of a wide range of innovative, unlicensed wireless devices. The question is in what spectrum should those devices operate and, more specifically, whether they can be expected to operate on the television broadcast spectrum and 3 GHz spectrum targeted in the NOI without causing interference to other users in those bands.

A. THE TECHNICAL DATA DOES NOT SUPPORT A DETERMINATION THAT CURRENT AND FORESEEN TECHNOLOGY WILL PERMIT UNLICENSED DEVICES TO CO-EXIST COMPATIBLY WITH LAND MOBILE OPERATIONS OPERATING ON SHARED TELEVISION SPECTRUM.

The basic premise of the Commission's inquiry is that it will be possible to design equipment capable of monitoring this spectrum to detect and avoid frequencies in use. The NOI even anticipates devices capable of using GPS technology that thereby will "know" not only where they are, but which channels are licensed in that area.[5]

The Commission's vision may become reality at some future date. However, the comments filed in response to the SPTF reports indicate that technology has not yet reached the FCC's expectations. For example, TIA described the state of development as follows:

[5] *Id.* at ¶ 13.

While TIA supports the SPTF addressing cutting-edge and forward-looking issues (i.e. using "white spaces" – temporal sharing), the Commission must recognize that many of the technologies cited (e.g., opportunistic devices, software defined radios that are completely agile in terms of operating frequencies, bandwidths, and modulation formats, and ultra wide band radios) are not likely to be ready for commercial availability for some time. Finally, the Task Force promotes concepts (such as the "interference temperature") that today are unproven and undefined. Allocations based on anticipated advances in technology are dangerous, and should await the demonstrable existence of such technology at reasonable costs for widespread deployment.[6]

Motorola expressed similar concerns:

While it may be appropriate for the Commission to seek to maximize the use of the spectrum by evaluating spectrum time-sharing, Motorola urges the Commission to proceed carefully so as not to jeopardize existing services. Motorola's two White Papers in this proceeding have highlighted some of the principal technical difficulties involved with exploiting the time dimension. For example, the White Papers note that determining whether a frequency channel is unused is far more complex than simply measuring activity on that channel in any one location. Considerable work remains to be done to fully understand how best to take advantage of this dimension.[7]

The company went on to note:

Motorola stresses, however, that the concept of interference temperature proposed in the Task Force Report is fraught with difficulty. That concept envisions the ability to dynamically allow unlicensed operations within licensed spectrum bands based on the detection of communications traffic. The fundamental task of determining and controlling the influence of a transmitter's emissions upon a remotely located receiver is an enormously complex problem. In the attached Appendix, Motorola identifies some of the technical hurdles that must be overcome before the potential benefits of the interference temperature concept might be realized. While we fully support further analysis and study, this concept is far from being ready for routine deployment in the real world as a reliable spectrum management tool.[8]

[6] TIA Comments at p. 3.
[7] Motorola Comments at pp. 8-9.
[8] *Id.* at p. 14.

These concerns are of particular relevance to the licensees of land mobile stations authorized by the FCC to share certain TV channels in specific markets.[9] Unlike television broadcast stations that are transmitting continuously at a constant power and, therefore, presumably would be detectable by the opportunistic unlicensed devices envisioned by the FCC, land mobile licensees are required by the FCC's rules to limit their transmissions to the minimum necessary.[10] Land mobile stations are not "on" or "off" on a predictable basis. Their communications are in dynamic flux over the course of an hour, a day, a week and even a year and involve the very disparate power levels of base/repeater stations versus mobiles mounted in vehicles versus hand-held portables. The number, regularity and power levels of their communications will depend on the entity that holds the license and innumerable extraneous factors.

For example, systems operated by taxicabs and delivery companies may have relatively constant communications during all but a few late night hours. By contrast, the communications of school bus operations are highly concentrated during defined parts of the day, and become extremely time sensitive if a child is missing or injured. Similarly, critical infrastructure entities such as utilities, nuclear power plants, and transportation providers not only rely on communications to manage daily operations, but also to provide return of service during natural or manmade disasters, and now help protect their infrastructure under homeland security. Moreover, and most critically, as the FCC presumably is aware the public safety community holds a significant number of licenses in the shared TV spectrum in many of the markets in which it is available. In fact, these channels are an indispensable element in public safety

[9] *See* 47 C.F.R. § 90.301 *et seq.*
[10] *See* 47 C.F.R. § 90.403.

communications in many large metropolitan areas, often providing vital communications links for first responders. In addition, the NOI includes 614-806 MHz in defining "TV broadcast bands" and specifically asks if unlicensed devices could co-exist with newly licensed services on former TV channels 52-69[11]. Public safety agencies will use this new spectrum for much needed additional communications, interoperability channels and new wideband public safety applications. Further, the 700 MHz guard band segment is providing spectrum to LMR users, including critical infrastructure entities. It is absolutely essential that all of the above spectrum be available for such users when they need it and for as long as they need it without having to contend with interference from an unlicensed device or having to wait until the transmissions of such devices have been completed.[12]

The Notice appears to recognize some of the issues that will arise if unlicensed devices are invited into this band. It notes that Channel 37 is allocated for radio astronomy operations and that unlicensed medical telemetry transmitters already are authorized to operate on Channels 7 through 46, and questions how to protect those operations from the devices in question.[13] It also queries whether there should be geographic limitations on the use of unlicensed devices that would prohibit them from being operated on the shared land mobile channels or near the Canadian or Mexican borders.[14]

Surely if the FCC has reservations about the interference potential to wireless medical telemetry and even radio astronomy operations in these bands, those concerns will be magnified

[11] NOI at ¶ 1, footnote 1, and ¶ 15, bullet 3.
[12] The NOI questions whether unlicensed devices, if authorized, should have limited "duty cycles" to prevent them from locking out licensed users seeking to use the channel. NOI at ¶ 16. While LMCC believes the record in this proceeding will demonstrate that unlicensed devices must not be given access to the TV band, should the FCC conclude otherwise it is essential that the devices be designed with some type of automatic time-out timer to prevent them from camping on a channel indefinitely.
[13] NOI at ¶ 14.

many times when contemplating the risk to public safety and other critical communications transmitted routinely by land mobile licensees. And the problem cannot be addressed by adopting a geographic restriction on the use of the devices as suggested in the Notice.[15] It is entirely unrealistic to suggest that unlicensed operations could be prevented from causing interference to land mobile users by adopting geographic restrictions on where the devices may be operated.[16] The NOI offers no explanation why it believes unlicensed users, most of whom surely have no idea that the devices are subject to FCC regulation at all, would adhere to such limitations if they were made aware of them, or how and against whom the FCC would attempt to enforce such a restriction when it was violated, as it certainly would be.[17]

Perhaps the Commission anticipates that the technology governing the devices will be sufficiently advanced to preclude their operation outside the authorized geographic areas, not unlike the invisible electronic fences intended to keep dogs within their owners' property. Of course, those barriers are breached routinely. The Commission should anticipate a similar result and not rely on either a regulatory or technical "fence" to protect land mobile systems operating on TV spectrum from destructive interference caused by unlicensed devices. Unless and until technology is developed that is **proven** capable of sharing this spectrum on an entirely transparent basis, technology that resolves the issues raised in the SPTF proceeding by TIA, Motorola, LMCC and others, the Commission must not authorize the deployment of unlicensed devices on the TV channels used by land mobile.

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[14] *Id.*
[15] *Id*. at ¶ 14.
[16] *Id.*
[17] The NOI raises that same enforcement question. NOI at ¶ 15.

B. THE COMMISSION SHOULD PROPOSE FURTHER LAND MOBILE SHARING OF UNUSED TELEVISION SPECTRUM.

Although the record does not support opening TV spectrum to unlicensed devices at this time, LMCC does agree that television spectrum is underutilized and should be placed into more productive use. As described in the Notice, this spectrum offers significant potential bandwidth because each TV channel is assigned a 6 MHz allocation and generous television protection criteria mean that certain TV channels are unused in each market.[18] The NOI also explains that because new digital TV systems will be more spectrally efficient, even fewer channels will be required to accommodate all existing television stations once the digital transition is completed.[19]

LMCC concurs with the FCC's premise, but not its conclusion. For the reasons detailed above, there is no record of support for a Commission finding that unlicensed devices could operate in the band without causing interference and substantial evidence that such a decision would be fatally premature. However, there is a more than thirty-year track record confirming that land mobile facilities licensed and operated in accordance with the well-established regulatory structure of Subpart L of the Part 90 rules can co-exist compatibly with television broadcast stations. To the best of LMCC's knowledge, there has not been a single reported, much less proven, instance of land mobile interference to broadcast operations in any market during the entire thirty-year sharing period. The reverse also is true. The numerous public safety, business and industrial systems sharing the use of this spectrum have enjoyed interference-free operation. In that sense, these services have been able to operate on an effectively transparent basis; neither is aware of the other and together they make more intensive use of valuable spectrum resources in key urban areas.

[18] NOI at ¶ 9.

The Notice posits that unlicensed devices are less likely to cause interference to licensed (presumably television) operations since they generally operate at lower power levels than commercial mobile radio services. It further notes that because the unoccupied TV channels vary from area to area and may change over time, it could be complicated to license commercial services on unused portions of the band.[20] While the Notice does not explain what "commercial" operation the FCC is referencing, it cannot be the type of land mobile facility that has shared spectrum with television successfully for more than three decades and which continues to experience an unsatisfied demand for spectrum in numerous major urban areas, including the eleven in which spectrum already is shared with TV broadcast.

LMCC urges the FCC to focus its efforts on identifying additional television/land mobile sharing opportunities, including those that will become available at the end of the digital transition period. This initiative would not be inconsistent with the possibility of allowing unlicensed devices into the band at some future date. The Notice itself states that its actions in this proceeding "are not intended to limit future licensed use or to guarantee spectrum access rights for this band.[21] To the extent that land mobile has a documented need for and could make immediate productive use of unused television spectrum,[22] the concepts outlined in the instant proceeding should not act as a deterrent. When and if technology is developed that will permit interference-free use of this band by unlicensed devices, the presence of additional land mobile stations will not impact their deployment.

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[19] *Id* at ¶14.
[20] *Id*.
[21] *Id*.
[22] Equipment capable of operating over a substantial part of the band has been available for decades. It is expected to be a relatively easy task to expand the frequency range over which this equipment can operate.

C. THE FCC SHOULD PERMIT UNLICENSED OPERATION IN THE 3650-3700 MHz BAND.

LMCC does support the proposal in the NOI to expand unlicensed operations into the 3650 MHz band. By contrast to the television spectrum discussed above, LMCC agrees with the FCC that this band is well-suited for this purpose. It is lightly used having recently been reallocated from its primary federal government allocation. It offers a contiguous 50 MHz of bandwidth that can support spread spectrum and other innovative operations. Moreover, it is low enough in the spectrum band to avoid susceptibility to interference from rain and other atmospheric conditions, yet high enough for the antenna directivity needed to permit intensive frequency re-use.

Several LMCC members have expressed specific support for this FCC proposal. They have indicated that they already are experiencing congestion and interference when operating unlicensed spread spectrum devices in the 902-928 MHz and the 2.4 and 5.8 GHz bands where the FCC permits the transmission of relatively high power levels. Their experience may prove illustrative as the FCC continues to explore opportunities for introducing such devices into other bands. It may be that the power limits authorized promoted the development of the bands and the spread spectrum applications available to be used, but at the expense of excessive interference and congestion. It will be important to balance these competing objectives as the Commission examines how best to promote these applications.

III. CONCLUSION

For the reasons described above, LMCC recommends that the FCC proceed promptly to act in a manner consistent with the positions expressed herein.

Respectfully submitted,

s:// Larry A. Miller

President

April 17, 2003